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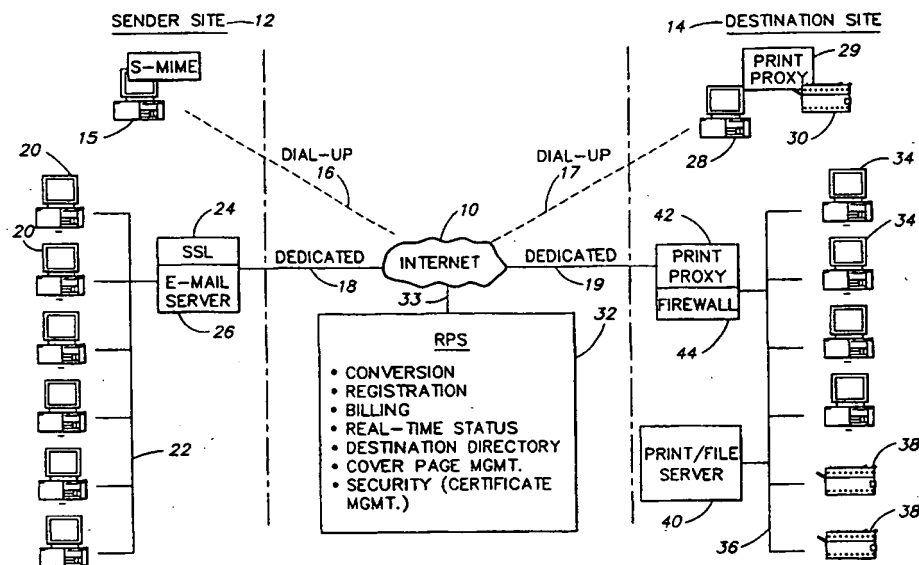
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(54) Title: METHOD AND APPARATUS FOR REMOTE PRINTING OF A DOCUMENT



(57) Abstract

Method and apparatus for network delivery and remote printing of documents. An e-mail message including a destination identifier is sent on a network to a remote print service (RPS) provider. The RPS provider receives the message and determines, from the destination identifier, a destination printer address and print format capabilities for a corresponding destination printer local to the intended recipient of the e-mail message. The RPS provider modifies the e-mail message to conform, as necessary, to the print format capability of the destination printer and sends the modified e-mail message on the network to the destination printer. The destination printer receives and prints the modified e-mail message.

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METHOD AND APPARATUS FOR REMOTE PRINTING OF A DOCUMENT

Field of the Invention

This invention relates generally to electronic document delivery, and more particularly to a network-based delivery service that directs e-mail messages to remote destination printers for automatic printing without requiring intervention by the intended recipient of the e-mail message.

Background of the Invention

Facsimile is a well-known and pervasive service: it allows a document to be transported from one physical location to another via electronic delivery with output at the destination in paper form. Two limitations of the present facsimile technology include a slow transmission speed, i.e., 20-60 seconds per page, and a resolution limited to a maximum of 200 dots per inch in fine mode. By comparison, a standard laser printer produces an output of 600 dots per inch at a rate of one page every 5-10 seconds.

E-mail is an alternative medium for transporting a message from one network computer to another: here the output is in electronic form (viewed on a display screen). It is well known that certain documents, depending on their length and content, are much easier to read from a printed page, rather than a display terminal. E-mail requires that the destination user take certain additional steps to convert an electronic "soft copy" into a printed "hard copy", and in many cases production of a hard copy from an e-mail can be quite cumbersome. For example, if an e-mail arrives with multiple file attachments, each file must be opened with its associated application in order to be printed.

Thus, it would be desirable to provide an alternative delivery method, ideally one combining the best features of the known delivery and printing methods.

Summary of the Invention

According to one embodiment of the invention, a method is provided for network delivery and remote printing of e-mail messages. The method includes the steps of sending an e-mail message, including a destination identifier, on a network to a remote print service (RPS) provider. The RPS provider receives the e-mail message and determines, from the destination identifier, a destination printer address and print format capability for a corresponding destination printer local to the intended recipient. The RPS provider modifies the e-mail message (including any enclosures or attachments) to

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5 conform, as necessary, to the print format capability of the destination printer and sends the modified e-mail message on the network addressed to the destination printer. The destination printer then receives and is enabled to automatically print the modified e-mail message.

In a more specific embodiment, a method is provided for a public internet
10 delivery and remote printing of e-mail messages which includes the step of providing a remote print service (RPS) for receiving and delivering e-mail messages on a public internet. A destination user registers with the RPS to accept e-mail messages from the RPS, and the destination user provides to the RPS a destination printer address and print format capability of a destination printer, which is local to the destination user. The RPS
15 maintains a database correlating the destination identifier to the destination printer address and print format capability. The RPS, upon receiving an e-mail message with the destination identifier, determines from the database the corresponding destination printer address and print format capability and modifies the e-mail message to conform, as necessary, to the format capability of the destination printer and addresses the
20 modified e-mail message to the destination printer for delivery on the public internet.

In another embodiment, a computer-implemented remote print service (RPS) directory is provided. It comprises a database correlating a destination identifier of an e-mail message to a destination printer address and print format capability for a corresponding destination printer.

25 In yet another embodiment, a computer-implemented print proxy is provided which comprises instructions for causing, upon receipt from a network of an e-mail message with a destination printer address, a destination printer having the destination printer address to print the e-mail message.

Other embodiments of the present invention will be more particularly described
30 by the following detailed description and drawings of certain embodiments.

Brief Description of the Drawings

Fig. 1 is a schematic illustration of a network connecting a sender site and a destination site, wherein the network includes a public internet, and a remote print service (RPS) is provided according to the present invention to process an e-mail
35 message being sent on the internet.

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5 Fig. 2A and 2B is a flowchart of one method embodiment of the present invention for implementing a remote print service (RPS), with a list of additional features which may also be provided according to the invention.

Fig. 3 is a block diagram illustrating a central processing unit and memory for use in this invention.

10 Detailed Description

According to the invention, a remote print service (RPS) is provided which allows an e-mail message and any attachments thereto to be converted to a print format compatible with a destination printer local to the intended recipient of the e-mail message, and delivered to the destination printer for printing. The RPS network services
15 may be centralized or distributed, depending upon the particular implementation. Also, as understood herein, the remote print service can be provided within a local area network (LAN), as part of a wide area network (WAN), or some combination of LAN and WAN. The wide area network may include a public internet. Furthermore, as used herein the term "e-mail message" is intended to include any message that is sent in
20 electronic form over a network; Simple Mail Transfer Protocol (SMTP) e-mail (and the related Post Office Protocol (POP) for receiving e-mail messages) is one possible communication protocol that can be used for delivering an e-mail.

By way of example, a standard SMTP e-mail address takes the form "user name @ domain name", e.g., the address of John Smith employed by UNX Corporation might
25 take the form "jsmith@unx.com". To utilize the RPS of the present invention, such an e-mail address may be modified to the form: "user name#domain name.com@rps.net", e.g., "jsmith#unx.com@rps.net". Upon arrival at the RPS provider (at e-mail address "rps.net"), the destination user name in the e-mail address is validated as a registered user of the service. The RPS provider then extracts from a database a destination printer
30 address and print format capability (e.g., printer type and driver) that corresponds to the destination user name (here "jsmith#unx.com"). Thereupon, the RPS creates a modified e-mail message which may include a cover page and a converted e-mail message which is consistent with the print format capability of the destination printer. The e-mail (including any attachments and enclosures) is converted and the modified e-mail (cover
35 page and converted e-mail with printer address) is sent to the destination printer. Upon receipt at the intended destination network printer, the modified e-mail is printed in

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5 paper form without requiring intervention by the intended human recipient (destination end user).

Many variations of the above addressing scheme are possible. For example, a telephone number may be used as a unique destination identifier, e.g., 978-551-7575, and another RPS provider name, e.g., "remote-print.net" for the RPS service provider. The
10 sender of the e-mail message would thus address it to: "978-551-7575@remote-print.net". In this case, the RPS would map (correlate) the telephone number to a corresponding destination printer address and print format capability local to the destination user. Note that in this case, the telephone number has no application to the telephone system — it is simply a means for uniquely identifying the recipient
15 (destination end user).

At the destination, the RPS communicates with a locally-installed network print software, a "print proxy", that handles communication security and coordinates the delivery of the modified e-mail message to the appropriate destination printer. The print proxy also provides status updates to the RPS as pages are successfully (or
20 unsuccessfully) printed at the destination printer. The RPS may store the acquired status information in one of its databases. This status information may then be accessed by one or both of the sender and the intended recipient to determine the delivery status of the message.

Other implementations which will be described below include:

- 25 ☐ the RPS enables end users located inside a company's local area network to print e-mail messages on any registered internal printer by using the RPS;
- ☐ the RPS enables companies with multiple offices connected by any form of WAN network to reduce their cost of communications by using the
30 RPS to remote print documents sent between offices.

Another option is to use an existing fax number as the remote printer identifier. This mechanism allows an organization to treat the RPS as an extension of a facsimile service. Instead of sending a fax, one can send a remote print document using the same fax number that is currently on a user's business card. The RPS would contain a
35 directory that maps the fax number (printer identifier) to the LAN or WAN address of the appropriate network-based printer. By using a valid fax number as the printer

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5 identifier, the RPS will also be able to use the existing fax machine as a backup delivery option (for printing) in the event that the destination (high speed network) printer is not available or is broken.

In one embodiment, one desiring to use the RPS registers as a destination end user. Then, as a registered user of the service, anyone in the world with access to a public internet and to SMTP e-mail will be able to send a document to the registered user which will be printed out, for example, on a high-speed, high-resolution laser jet printer located in or near the user's office. The registered user may be billed for the service, irrespective of who sends the message.

In another embodiment, the service requires that both the sender and the receiver be registered for the service. Then one or both of the sender and receiver may be billed for the service, e.g., billing may be based on the number of pages sent, the size of the printed file and/or a flat monthly fee for unlimited use of the RPS.

Fig. 1 shows a particular implementation of the remote print service which will be described by way of example below. An Internet cloud 10, intended to represent a wide area network including one or both of the public internet and a private network, is shown in the center between a sender site 12 on the left and a destination site 14 on the right. Connections to the Internet from both the sender and destination sites may be by dial-up lines 16, 17 or dedicated lines 18, 19. The sender site has an S-MIME (Multipurpose Internet Mail Extension) client 15 connected by dial-up line 16 to the Internet. The sender site also has a plurality of individual personal computers 20 connected by a local area network (LAN) 22 to an SSL server 24 and an e-mail server 26; the e-mail server 26 is connected by dedicated line 18 to the Internet. On the other side, the destination site 14 has a single computer 28 and a single laser printer 30, local to the computer 28, connected by dial-up line 17 to the Internet. A print proxy software 29 interfaces with the dial-up line 17 for receiving a modified e-mail from the RPS server 32 over the Internet. The destination site 14 also has a plurality of personal computers 34 connected to a local area network 36, and a plurality of laser printers 38 connected to the local area network 36 as well. A network print/file server 40 controls the network printers 38, and a print proxy 42 and a firewall 44 are shown connected to the Internet by way of dedicated line 19 to control access to the LAN 36. The print proxy 42 will receive the modified e-mail from the RPS server 32 over the internet.

5 The RPS is shown as a server 32, connected by line 33 to the Internet 10,
whereby it receives e-mail messages intended to be sent from the sender site 12 to the
destination site 14 where both sender and destination are registered users of the service.
The RPS 32 receives an e-mail message from the sender site 12, and sends a modified e-
mail message to a printer (38 or 30) at the destination site 14 — whichever printer is
10 designated for the intended recipient of the e-mail message. In this example, the RPS
includes the following services:

- 15 □ Security service provides standards-based authentication and encryption
services to validate and protect the sender: the supported standards
include S-MIME clients and SSL (Secure Socket Layer) servers. Suitable
systems which incorporate these standards are available from Microsoft,
Netscape, and Baltimore Technologies. The sender is required to use the
standards-based security software in order to gain access to the RPS; this
insures accurate billing for the service. Corporations would be expected
to implement SSL security at the server level, while small office/home
20 office customers would utilize S-MIME client software.
- Registration service provides Web-based registration for both senders and
destinations wishing to use the RPS. For example, senders may register
over the Web by creating either individual accounts or corporate accounts.
Corporations have the option to authorize access to every end user in a
25 given e-mail domain or only specific end users. Destinations will install
or enable the appropriate print proxy software; the print proxy software
will interface with the printer management software running on the
destination site, as opposed to the printers themselves.
- Billing service enables billing of the sender for delivered pages, and will
30 allow the destination to establish a fee for the printing of documents at the
destination end.
- Real-time delivery status service allows both the sender and destination to
track the status of all e-mail messages utilizing the service in real-time via
the Worldwide Web.

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- 5 ☐ Directory service provides a destination identifier to destination printer routing information, destination printer capabilities, and end user service preferences.
- ☐ Cover page management service allows senders to create and maintain any number of custom cover pages for use with the RPS. A corporation
10 can have a default cover page for all senders, with departments and select end users defining personalized cover pages if appropriate.
- ☐ Conversion service converts the sender's e-mail message (with enclosures and attachments) into a printer output file using the appropriate print
15 driver for the destination printer.

15 For purposes of this example, anyone who is a registered RPS user can use the RPS service to cause an e-mail document to be printed on a network-based printer at a destination site, if the destination printer has been registered with the RPS. The service assumes that both the sender and receiver have been registered on the service. However, the service will work if only the recipient is registered as long as the recipient is willing
20 to pay for the service of allowing other people to send documents to them via the RPS.

 In order to register as a recipient, an end user must register a printer identifier, which in this case we assume will be the end user's phone number. The registered user also needs to provide a destination printer address, a printer type, and an IP address of a print proxy that is located outside of the security firewall (e.g., 44) of the organization.

25 Using this implementation, the service will allow a user A at the sender site 12 to send a remote print document to user B at the destination site 14, by addressing an e-mail message, with or without enclosures and attachments, as follows: "978-551-7575@remote-print.net". In this example, "978-551-7575" is the unique phone number for user B and "remote-print.net" is the SMTP mail address for the RPS.

30 The RPS 32 receives the e-mail message and gathers both the "from" address and the "to" address from the e-mail message. The "from" address is used to determine if the sender (user A) is a registered user, and to determine the cover page template registered by the sender. In this implementation, if the sender is not registered then the remote print service will return a message via e-mail to the sender that tells the sender how to
35 register for the service. However, if the recipient (user B) wanted to offer a "toll-free"

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- 5 remote print number, then the sender would not need to be registered to use the service. Using the toll-free example, the RPS would bill the recipient for the service regardless of who sent a message.

The remote print service 32 uses the "to" address to look up the following registration information in a database directory:

- 10 ☐ network address of the recipient's print proxy;
- ☐ network address of the recipient's network printer;
- ☐ type of network printer;
- ☐ security related data, if appropriate, e.g., digital certificate information;
- 15 ☐ alternate delivery address, e.g., alternate printer or fax machine or both;
- ☐ e-mail address of the recipient.

- The remote print service assembles a complete remote print document by creating the cover page from the header and text of the e-mail and by collating and counting the
- 20 pages of each attachment. The cover page will include the name of the intended recipient as registered with the RPS. The cover page will also include a summary page count (e.g., six pages including the cover sheet) which will be determined by counting the total number of pages included with each attachment. The final output is prepared using the specific print format of the registered network printer. The output is sent to the
- 25 print proxy 42 via a WAN or LAN connection. The implementation above assumes the use of the Internet 10 as the WAN connection. The print proxy 42 submits the print job to the appropriate network printer 38 and return status information to the remote print service 32. The remote print service posts status information on the Internet web-based status service which can be accessed by both the sender and the recipient. If the print job
- 30 goes through as expected then the remote print service updates the status service and submits a billing event. If the print jobs fails partially or completely, then the remote print service utilizes the concepts of alternative delivery, such as retrying, rerouting or rescheduling the document for delivery. The cycle continues until the document is delivered or canceled by the sender.

5 The specific implementation outlined here assumes that the recipient could register a second printer as an alternate delivery device, or the recipient could register a fax machine as an alternate delivery device to be used in the event of a delivery problem. The implementation assumes that the status service will inform both the sender and recipient of the time and location of delivery of the message.

10 The following end user experience summarizes the experience from the perspectives of the sender and recipient:

Sender Experience

15 Finding A Printer Address: If a sender already knows that the recipient has a registered printer, then all the sender needs to know is the recipient's phone number to accurately address a message. If the sender is not certain, the RPS Web site will provide a directory for locating registered users based on phone number, name, company name, location, etc. The RPS directory will also contain a listing of printer attributes in the event that the sender wants to take advantage of the full range of capabilities of the destination printer.

20 Addressing A Message: Create an SMTP e-mail message with any number of attachments and address as follows:
25 phone number@remote-print.net.

30 Real Time Delivery Status: Real time delivery status will be available on the RPS Web site. Individual senders will maintain their own password to gain access to the status of their specific documents. Delivery status is an HTML (Hypertext Mark-up Language) service that can be accessed from any type of browser.

Billing: Senders will be billed for use of the RPS service on either a usage basis or via a flat monthly fee per end-user. Registration is assumed to be free.

35 Cover Page Management: Senders have the option to create a custom cover-page which will be used by the RPS service in

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5 delivering documents from the sender. The Cover Page Management service allows cover pages to be established for a department, office, division, business unit, or entire corporation.

10 E-Mail Notification: Senders will have the option to receive e-mail notification of delivery problems and/or delivery confirmation in local language at no charge.

Recipient Experience

15 Receive A Document: RPS documents will show up on the recipient's designated printer with a cover page addressing the document to the appropriate recipient.

E-Mail Notification: Recipients will have the option to request e-mail notification of in-bound documents at no additional cost.

20 On-Line Status: If a recipient is waiting for an important document the recipient will be able to check status of in-bound documents via the Web.

Fig. 2A and 2B illustrates in flow chart form three events--sending, converting and printing an e-mail message, according to an embodiment of the present invention. In a first step 60, a sender prepares an e-mail message (as used herein e-mail message includes any
25 attachments and enclosures); the e-mail message includes an address specifying the destination identifier and the RPS. The e-mail message is then sent on the Internet to the RPS. In a second step 62, the RPS receives the e-mail message, determines the destination printer address, and printer type from the destination identifier, and creates a modified e-mail message by adding a cover page, converting the e-mail message as
30 necessary to the format of the destination printer, and providing an address of the destination printer. The modified e-mail message is then sent on the Internet to the destination printer. In a third step 64, the print proxy at the destination printer receives the modified e-mail and the modified e-mail is then printed at the destination printer, without requiring intervention of the recipient.

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5 Fig. 2A and 2B also illustrates for each of the steps 60, 62, 64 respective optional features 61, 63, 65 which may be provided according to the present invention. These optional features are discussed in greater detail in other parts of the specification.

 For example, one optional feature of the present invention is used to simplify the printing of inbound fax messages. There is a messaging service called "inbound fax" that is becoming increasingly popular. Inbound fax assigns a personalized fax number to a specific individual which can be used to route a fax message into the end user's e-mail in-box. With an inbound fax service, an end user receives e-mail messages with an attachment that is a fax (TIFF) image. In order to view the inbound fax the end user must load up either a standard TIFF viewer or proprietary fax viewer software provided by the inbound fax service to view and print the inbound fax. In contrast, the RPS service according to the present invention can be used as a mechanism to simplify the printing of inbound fax messages that are received by an end user as e-mail attachments. Instead of loading up a TIFF viewer, the end user can forward the e-mail message (with attachments and enclosures) to the RPS, and the RPS will respond back with a formatted cover page and fax message printed out for the end user. The end result is that the end user was able to "remote print" an inbound fax message by simply forwarding the inbound fax e-mail to the remote print service.

 Another optional feature can be used to reduce the cost of desktop faxing for a multi-location enterprise customer. For example, UNIFI Corporation of Lowell, Massachusetts provides a desktop fax service that utilizes IP backbone networks to deliver fax messages which originate on a desktop PC. The remote print service of the present invention can be used as a mechanism which will substantially reduce the cost of desktop fax messages which flow between offices of a large corporation. The typical desktop fax service allows an end user to send a document via fax by using SMTP addressing as a mechanism for working with a network-based fax service. One addressing standard that is common in the industry is as follows: "fax number@vendor.com". The desktop fax vendor receives the message and forwards the message to the destination fax number contained in the message. If the destination is registered as a remote print service customer, then the desktop fax vendor would have the option to look at the destination fax number, check the remote print service to find out if the fax number is registered with a remote print address and reroute the message to

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5 the remote print address rather than the fax address. The benefit of rerouting is that the
outbound message can be delivered to the destination via the public Internet with no
connection to the public switched telephone network (PSTN). By completely
eliminating the PSTN from delivery of the fax message, the cost of the delivery can be
reduced. This specific implementation assumes that the destination fax machine has
10 been previously registered with the remote print service and the company that owns the
fax machine is requested that fax messages should be rerouted to the remote printer to
save money. This implementation would be desirable to companies with multiple
offices--every time an employee sends a desktop fax message to a fax machine located at
one of the company's offices, the remote print service will reroute the message to the
15 remote printer thus reducing the cost.

In the implementation described above, the multi-location company could
achieve similar cost savings by training its employees to always use remote printing as
an alternative to desktop faxing when communicating between offices. However, this
solution requires that the end users alter their prior behavior.

20 Still another optional feature is to simplify the printing of e-mail messages with
attachments. Similar to the option previously described with regard to inbound fax
messages, an inbound e-mail message (with enclosures and attachments) can be sent by
the end user to the RPS, which will return back a correctly collated and counted print file
with the formatted cover sheet which can be automatically sent to a printer local to the
25 end user.

Still another option allows an end user to send a message with any number of
attachments, and any type of attachments, to any number of destinations in a single
action. For example, the same message can be sent via e-mail to one destination, via
remote print service to another destination, and via desktop faxing to a third destination.
30 all in one message.

The RPS server may be implemented using computers manufactured by Hewlett
Packard or Sun Microsystems. Database management software is available from Oracle
Corporation. Complete systems which perform similar functions are available from
network service providers such as UNIFI Communications, Inc. The print proxy may be
35 implemented using computers available from Compaq or Dell, with commercially
available or user designed software.

5 Various features of the invention may be implemented using a general purpose computer 161 as shown in Fig. 3. The general purpose computer may include a central processing unit (CPU) 162, memory 163, a processing bus 164 by which the CPU can access the memory, and interface 165 to the network. Thus, the invention may be implemented using hardware and/or software.

10 Although several preferred embodiments of the invention have been specifically illustrated and described herein, it is to be understood that variations may be made without departing from the scope of the invention as defined by the appended claims.

5

CLAIMS:

1. A method for network delivery and remote printing of e-mail messages comprising:

 sending an e-mail message, including a destination identifier, on a network to a remote print service (RPS) provider;

10 the RPS provider receiving the e-mail message and determining, from the destination identifier, a destination printer address and print format capability for a corresponding destination printer;

 the RPS provider modifying the e-mail message to conform, as necessary, to the print format capability of the destination printer and sending the
15 modified e-mail message on the network to the destination printer; and
 the destination printer receiving and printing the modified e-mail message.

2. The method of claim 1, wherein an intended destination of the e-mail message must be registered with the RPS provider to allow the delivery and remote
20 printing.

3. The method of claim 2, wherein a sender of the e-mail message must be registered with the RPS provider in order to allow the delivery and remote printing.

4. The method of claim 3, wherein one or more of the intended destination and sender are billed for the delivery and remote printing.

25 5. The method of claim 1, wherein the destination identifier is selected from an e-mail address, and a telephone number.

6. The method of claim 1, wherein the e-mail message received by the RPS provider has an address which includes a name of an intended destination and a name of the RPS provider.

30 7. The method of claim 1, wherein the e-mail message includes attachments which are conformed, as necessary, by the RPS provider and included in the modified e-mail message.

8. The method of claim 1, wherein the RPS provider adds a cover page to the modified e-mail message.

5 9. The method of claim 8, wherein the cover page identifies one or more of an intended destination, a sender of the e-mail message, the RPS provider, and information for registering with the RPS provider to receive modified e-mail messages.

 10. The method of claim 1, wherein the RPS provider tracks a delivery status of the e-mail message and the modified e-mail message.

10 11. The method of claim 10, wherein each of a sender and an intended destination can access the delivery status at the RPS provider.

 12. The method of claim 10, wherein the delivery status is accessible at a web site.

 13. The method of claim 10, wherein the delivery status is accessible via a
15 web browser.

 14. The method of claim 1, wherein a print proxy local to the destination printer receives the modified e-mail message and instructs the destination printer to print the modified e-mail message.

 15. The method of claim 14, wherein the print proxy provides a delivery
20 status to the RPS provider.

 16. The method of claim 1, wherein the e-mail message is an SMTP e-mail message.

 17. The method of claim 1, wherein notification of one or more of delivery confirmation and delivery problems are sent to an intended destination having the
25 destination identifier.

 18. The method of claim 17, wherein the notification is by e-mail.

 19. The method of claim 1, wherein a sender of an e-mail message can access the RPS provider for destinations which are registered with the RPS provider to receive modified e-mail messages.

30 20. The method of claim 1, wherein the network includes a public internet.

 21. The method of claim 1, wherein prior to sending an e-mail message on the network, the e-mail message is selected for delivery by one or more of the RPS provider, a facsimile service on a private network, a facsimile service on a public switched telephone network, and e-mail delivery service via the public Internet.

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5 22. The method of claim 1, wherein prior to sending an e-mail message on the network, the e-mail message is encrypted.

 23. The method of claim 1, wherein prior to sending an e-mail message on the network to the RPS provider, a network or computer local to a sender of the e-mail message confirms that the sender is registered with the RPS provider.

10 24. The method of claim 1, wherein the RPS provider sends a registration mail message to a sender of the e-mail with information on registering with the RPS provider.

 25. The method of claim 1, wherein the RPS provider provides one or more alternative delivery capabilities including re-try, re-routing, and re-scheduling.

15 26. The method of claim 1, wherein a destination that receives an inbound fax forwards the inbound fax as an e-mail message to the RPS provider and the RPS provider creates a modified e-mail message which is sent on the network to a destination printer corresponding to the destination for receiving and printing the modified e-mail message.

 27. A method for public internet delivery and remote printing of e-mail
20 messages comprising:

 sending an e-mail message, including a destination identifier, on a public internet to a remote print service (RPS) provider;

 the RPS provider receiving the e-mail message and determining, from the destination identifier, a destination printer address and print format capability for
25 a corresponding destination printer;

 the RPS provider modifying the e-mail message to conform, as necessary, to the print format capability of the destination printer and sending the modified e-mail message on the public internet to the destination printer; and
 the destination printer receiving and printing the modified e-mail
30 message.

 28. A computer-implemented remote print service (RPS) directory comprising:

 a database correlating a destination identifier of an e-mail message to a destination printer address and print format capability for a corresponding
35 destination printer.

5 29. A computer-implemented print proxy comprising:

instructions for, upon receipt from a network of an e-mail message with a destination printer address, causing a destination printer having the destination printer address to print the e-mail message.

30. A method for public internet delivery and remote printing of e-mail
10 messages comprising:

providing a remote print service (RPS) for receiving and delivering e-mail messages on a public internet:

a destination user registering with the RPS to accept e-mail messages from the RPS, and the destination user providing to the RPS a destination printer address and print format capability of a destination printer, local to the
15 destination user;

the RPS maintaining a database correlating a destination identifier of the destination user to the destination printer address and print format capability of the destination printer; and

20 the RPS, upon receiving an e-mail message with the destination identifier, determining from the database the corresponding destination printer address and print format capability and modifying the e-mail message to conform, as necessary, to the format capability of the destination printer and addressing the modified e-mail message to the destination printer for delivery on the public
25 internet to the destination printer for printing.

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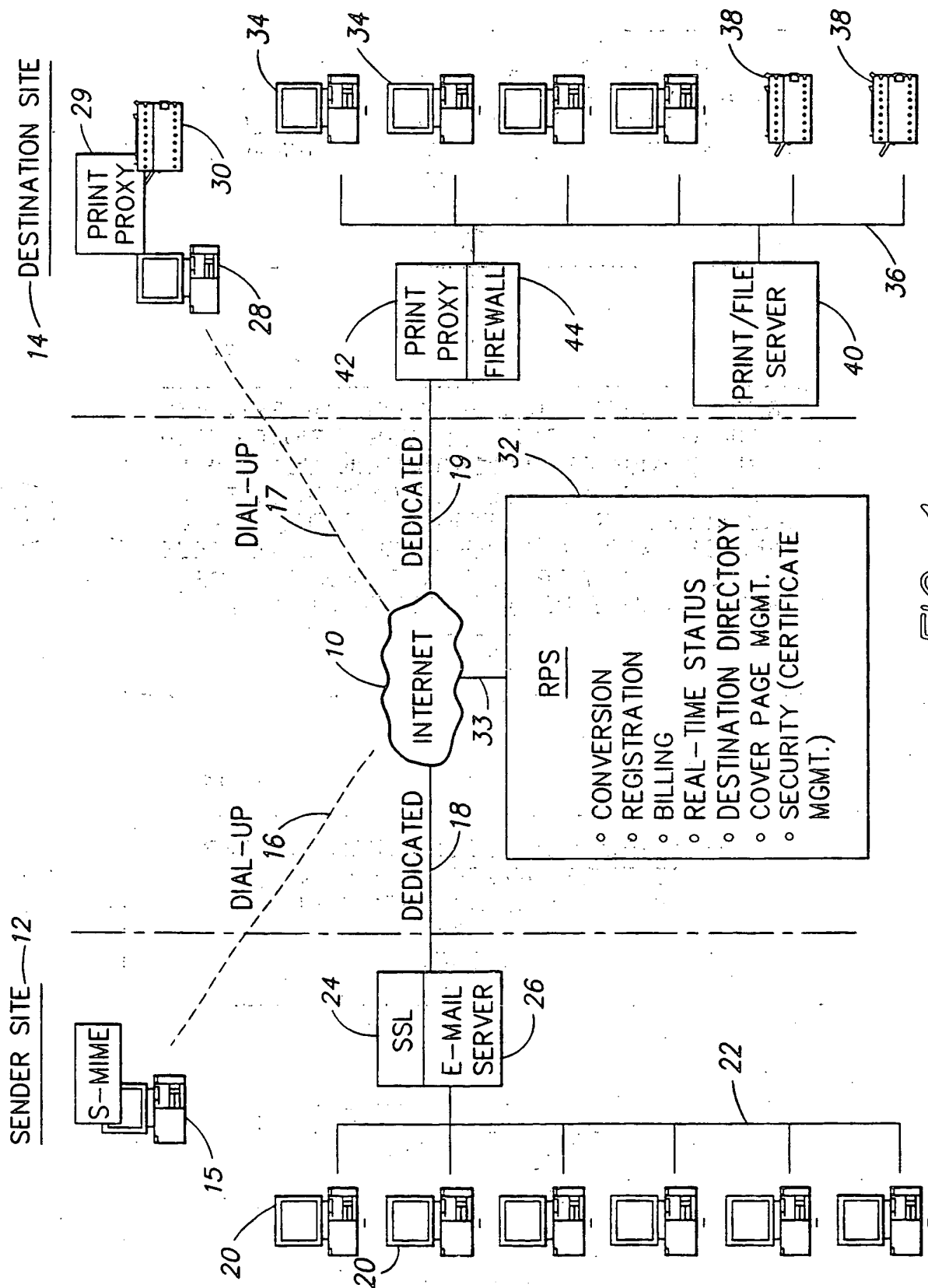


FIG. 1

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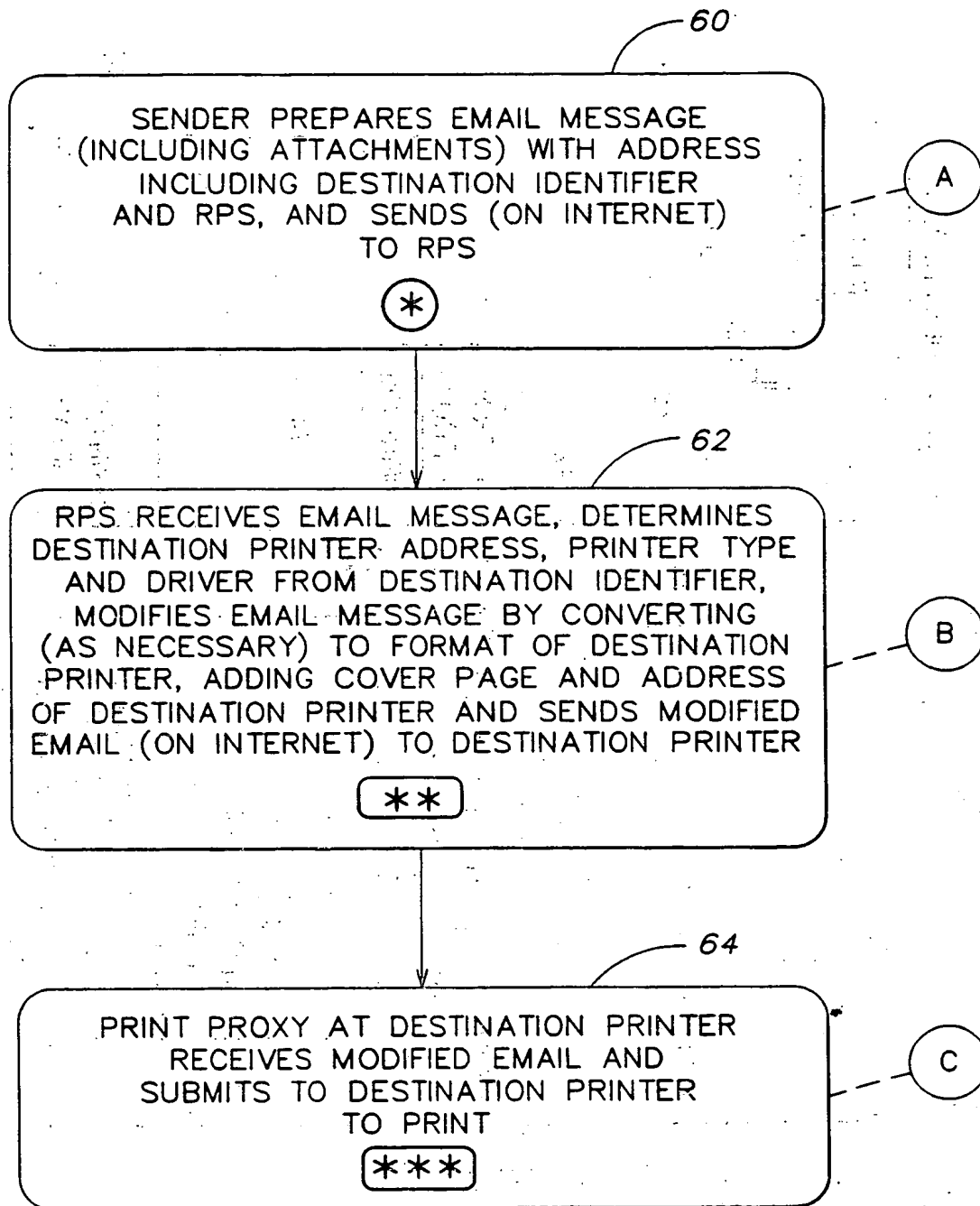


FIG. 2A FIG. 2B

FIG. 2A

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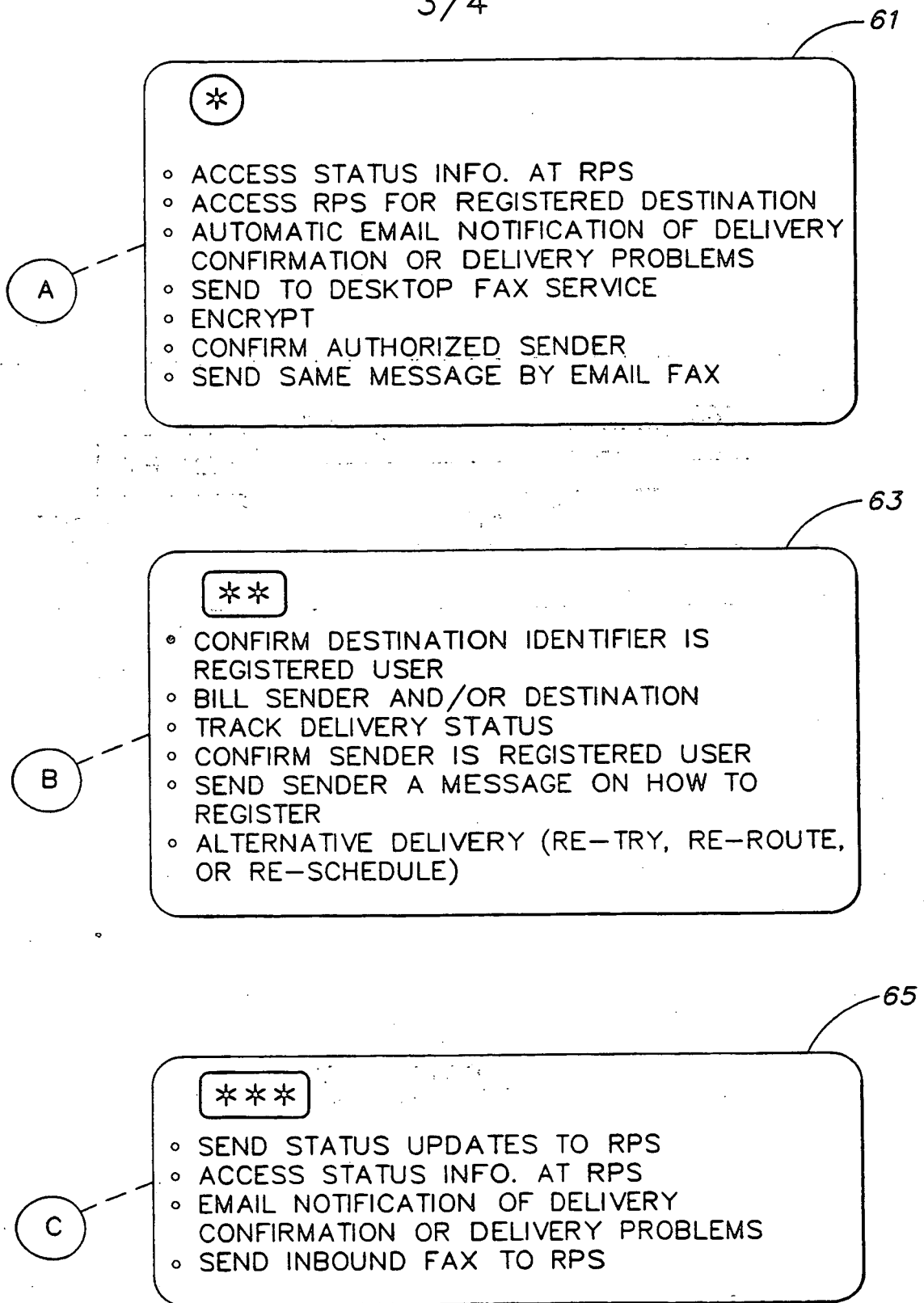
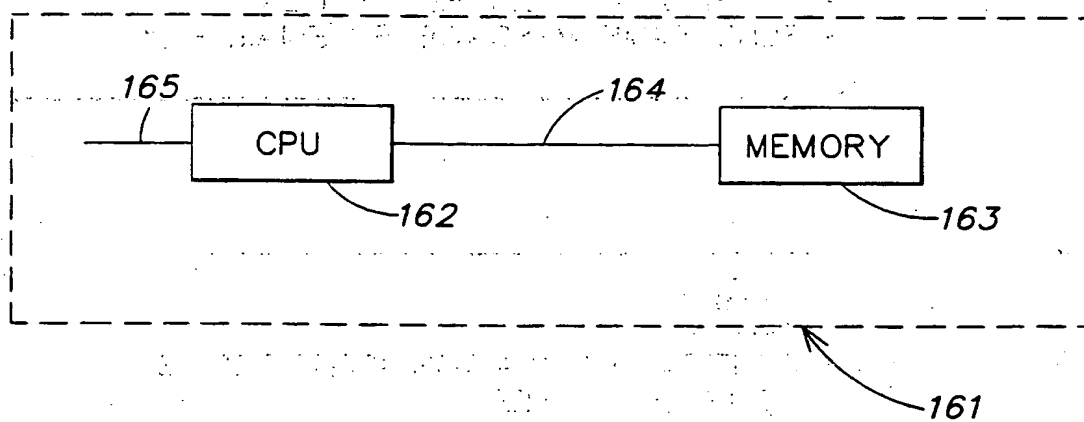


FIG. 2B

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**FIG. 3**

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/00022

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F3/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94 06230 A (OCTUS INC) 17 March 1994 (1994-03-17) figures 1,3,48,10-12 page 6, line 16 -page 9, line 23 page 33, line 27 -page 42, line 22 ---	1-5, 7-10,14, 21,26-30
A	EP 0 886 206 A (HEWLETT PACKARD CO) 23 December 1998 (1998-12-23) figures 1,2 column 3, line 26 -column 4, line 29 -----	1,2,6,7, 10-15, 20,27-30

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

2 June 2000

Date of mailing of the international search report

09/06/2000

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/00022

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9406230	A	17-03-1994	AU 5100593 A	29-03-1994
EP 0886206	A	23-12-1998	JP 11024870 A	29-01-1999

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